



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/665,122	09/20/2000	In-Kyeong Yoo	10.249.216	8566
27849	7590	04/22/2004	EXAMINER	
LEE & STERBA, P.C. 1101 WILSON BOULEVARD SUITE 2000 ARLINGTON, VA 22209			MACCHIAROLO, PETER J	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/665,122		YOO, IN-KYEOUNG	
	<b>Examiner</b>		<b>Art Unit</b>	
		Peter J Macchiarolo	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. ____.  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____.   | 6) <input type="checkbox"/> Other: ____.                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. **Claims 3 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

2. The term “easily” and “readily” in claims 3 and 7, respectively, are relative terms which renders the claims indefinite. The terms are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamoto et al (USPN 5747926; “Nakamoto”).**

4. Regarding claim 1, Nakamoto discloses in figure 5H, a lower electrode (106), a ferroelectric layer (102), having a top surface with two end portions, overlies the lower electrode, an insertion electrode (302) formed on a region excluding the two end portions of the top surface

Art Unit: 2879

of the ferroelectric layer, a dielectric layer (303) having a predetermined pattern (center aperture) is formed along the top surface of the ferroelectric layer and the insertion electrode, and a dummy upper electrode (304) formed on a side of the dielectric layer opposite the ferroelectric layer.

5. Regarding claim 2, Nakamoto further shows that the dielectric layer (303) has a top surface with two end portions and the predetermined pattern is formed along the top surface of the dielectric layer excluding the two end portions.

6. Regarding claim 3, Nakamoto further discloses the dummy upper electrode is easily separable from the dielectric layer.<sup>1</sup>

7. Regarding claim 4, Nakamoto further shows the dummy upper electrode is formed on a region of the dielectric layer excluding the patterned portion thereof.

---

<sup>1</sup> Nakamoto, col. 11, l. 59 to col. 12, l. 3.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**8. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamoto in view of Wu et al (USPN 5432015; "Wu").**

9. Regarding claims 5 and 6, Nakamoto discloses in figure 5h, a lower electrode (106), a ferroelectric layer (102) having a top surface with two end portion, overlies the lower electrode, an insertion electrode (302) formed on a region excluding the two end portions of the top surface of the ferroelectric layer, a first dielectric layer (303) having side edges and a top surface is formed along the top surface of the ferroelectric layer and the insertion electrode, the side edges being projected, a dummy upper electrode (304) formed on one projected side of the first dielectric layer.

10. Nakamoto is silent to a second dielectric layer being formed along the top surface of the first dielectric layer excluding the projected edges.

11. However, Wu teaches that it is difficult to produce a dielectric layer with a smooth surface having a high dielectric constant with the presently available ceramic material. Thus, a dielectric layer is formed as two layers, a first dielectric layer formed having a higher dielectric constant value, and a second dielectric layer which provides a smooth surface.<sup>2</sup>

---

<sup>2</sup> Wu, col. 8, ll. 36-47.

Art Unit: 2879

12. Furthermore, it would have been an obvious matter of design choice to manufacture a second dielectric layer on the top surface of the first dielectric layer excluding the projected edges, and the first dielectric layer having a higher dielectric constant, since Applicant has not adequately disclosed any testing or analytical data which establishes criticality for this modification, or recites any specific advantage the invention benefits from over the prior art from this modification. It appears that Nakamoto's emitter would perform equally well when having a second dielectric layer on the top surface of the first dielectric layer excluding the projected edges, and the first dielectric layer having a higher dielectric constant.

13. Therefore, in view of the above discussion, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Nakamoto's device with Wu's multiple dielectric layering, to allow for an electron emitting surface to be smooth, thereby guaranteeing uniform electron emission from a wide or narrow region and in an isolated pattern.

14. Regarding claim 7, Nakamoto discloses the dummy upper electrode is readily separable from the first dielectric layer.<sup>3</sup>

### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

---

<sup>3</sup> Nakamoto, col. 11, l. 59 to col. 12, l. 3.


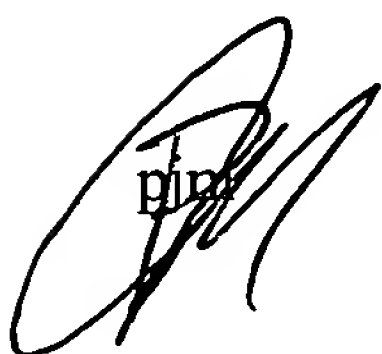
Art Unit: 2879

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (571) 272-2375.

The examiner can normally be reached on 8:30 - 5:00, M-F.

17. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571) 272-2475. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



NIMESHKUMAR D. PATEL  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600